



DENTAL PROGRAMS ENVIRONMENTAL COMPETENCY

DEPARTMENT OF ECOLOGY
HAZARDOUS WASTE AND TOXICS REDUCTION PROGRAM
PUBLICATION 97-412

printed on recycled paper



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<p style="text-align: center;">DENTAL PROGRAMS Environmental Competency <i>Ecology Publication #97-412</i></p>
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SECTION A: Environmental Management

A.1. Understand the Importance of Environmental Management in the Shop Setting.

A.1.1. Describe why it is important to properly manage all wastes.

Performance Objective 1: The student will be able to list some reasons why they must properly dispose of the wastes they create.

- 1) To be in compliance with the laws.
- 2) To avoid fines from regulatory agencies.
- 3) To protect themselves and others from injury and illness.
- 4) To avoid being liable for environmental cleanup.
- 5) To prevent pollution.
- 6) To be a responsible citizen.
- 7) To stay in business.

A.1.2. Know where hazardous waste regulations are found and what agency enforces them.

Performance Objective 1: The student will be able to cite the legal reference for hazardous waste management requirements.

LAW: Chapter 70.105 RCW, **Hazardous Waste Management Act of 1976**

REGULATION: Chapter 173-303 WAC, the **Dangerous Waste Regulations** (The regulation implements the law).

Performance Objective 2: The student will know which Agency enforces the regulations and provides technical assistance, and how to obtain a copy of the regulations.

The **Dangerous Waste Regulations** are enforced by the State Department of Ecology. They can provide you with a copy. Ecology provides assistance to keep businesses in compliance with the laws.

A.1.3. Understand the purpose of the “Waste Management Hierarchy”.

Performance Objective 1: The student will understand what the Waste Management Hierarchy is.

- The Waste Management Hierarchy was set by the legislature to encourage reduction and recycling of wastes instead of disposal.
- The purpose is to provide environmental protection by preventing wastes from being generated rather than controlling the wastes after they have been created.
- Being “in compliance” with the laws means you are doing what is required. The goal of the hierarchy is to think “beyond compliance”, to go the next step to eliminate, reduce, reuse, or recycle your waste.

Performance Objective 2: The student will understand the methods of handling waste in the preferred order, and provide an example of each.

Waste Reduction - To not create a waste in the first place.

- Consider using filmless x-ray or other new technologies that reduce waste.
- Use durable supplies when possible, including metal instruments and gowns.

Recycling - Reclaim or reuse the waste.

- Collecting used developer for pick-up by reclaimer.
- Recycling lead foil X-ray film packets.
- Collecting waste amalgam for reclamation of mercury and silver.

Treatment - To perform a process on the waste to eliminate its hazards or prepare it for disposal.

- Evaporating cabinet washer water to reduce it's volume.
- Neutralizing acids or bases prior to disposal.

Incineration - To thermally destroy a waste in an approved incinerator.

- Sending hazardous waste to a facility to be thermally destroyed.

Landfill - To put into an appropriate landfill.

- Sending hazardous waste to a designated Hazardous Waste Landfill.

Performance Objective 3: Given waste streams typical of the shop, the student will be able to determine if there is a more environmentally sound way to manage the waste.

Performance Objective 4: The student will be able to articulate why waste reduction is the highest priority.

Land disposal and incineration of wastes can be harmful to the environment and costly for the generator. By reducing the amount of waste produced, you can:

- 1) Protect the environment and human health
- 2) Save money
- 3) Reduce your financial liabilities
- 4) Avoid some regulations

A.1.4. Understand what is meant by the term “pollution prevention”.

Performance Objective 1: The student will be able to articulate what “pollution prevention” means and provide general examples.

Pollution prevention is any method of reducing the amount of toxic materials used or released to the environment. It can be accomplished by:

- Replacing toxic materials with less toxic or non-toxic substitutes.
- Changing a process so a hazardous material is no longer needed.

A.1.5. Understand why pollution prevention is desirable.

Performance Objective 1: The student will be able to articulate how pollution prevention can benefit business, employees, and the environment.

- Reducing or replacing toxic materials reduces exposure to harmful substances, creating a healthier, safer workplace.
- By preventing wastes from being generated, you reduce hazardous waste management and disposal costs and liability.

A.2. Understand the basic waste management elements which are required by law for waste accumulation areas, containers, and labeling.

A.2.1. Describe the key requirements of waste accumulation areas.

Performance Objective 1: The student will be able to describe the key required elements of a waste accumulation area.

Waste accumulation areas must:

- Be well defined
- Be well marked with warning signs
- Have secondary containment

Performance Objective 2: The student will understand what secondary containment is and determine if it is sufficient in a given waste storage situation.

Secondary containment:

- Waste storage areas must have the ability to contain spills from tipped, overfilled, or ruptured containers.
- The containment must be able to hold 10 percent of the capacity of all stored containers or 110 percent capacity of the largest container, whichever is greatest.

A.2.2. Identify the basic waste container management requirements.

Performance Objective 1: The student will be able to identify the basic waste container management requirements.

- 1) Must be *suitable* for the waste
- 2) Must be in good *condition* and able to hold the waste
- 3) Must be kept *closed*
- 4) Must be *labeled* as hazardous waste
- 5) Must be *labeled* with the appropriate risk warning.

Performance Objective 2: The student will be able to determine if a container is appropriate for a given waste stream.

1) Suitability

Type of Waste:

Waste Solvent

Waste Corrosives

Waste Acids

Appropriate Container:

Metal container

Plastic container

Plastic container

2) Condition

Appropriate:

Clean

Can hold the waste

Not Appropriate:

Contaminated with other waste

Cannot hold waste due to: Sprung seams
dents, holes, rust

Performance Objective 3: The student will be able to demonstrate how to close and label a container.

1) Keep Closed: Containers must be kept closed except when emptying or filling.

- The bung should be screwed in tightly.
- Ring lock, if present, should be closed securely to avoid leaks.
- Funnels should be removed except self-closing ones.

2) *Labeled:* Waste containers must be labeled with:

<u>Information on label:</u>	<u>Example:</u>
Dangerous waste	“DANGEROUS WASTE”
The type of waste described	“WASTE AMALGAM”
The hazards listed	“TOXIC”

A.3. Understand what the requirements are for spill prevention and cleanup.

Performance Objective 1: The student will be able to articulate the key elements of a spill response plan.

- Instructions on what to do when hazardous materials are spilled
- Who to notify
- The type of personal protection equipment needed
- The location of the spill cleanup supplies
- How to neutralize spills, if possible
- How to dispose of the wastes after cleanup
- How to prevent spills from occurring

Performance Objective 2: The student will be able to demonstrate what to do in case of a large spill of hazardous material.

- Locate and properly use spill response materials
- Contain the spill
- Contact the proper authorities
- Clean it up
- Manage the wastes properly

SECTION B: Dental Program Waste Management

B.1: Understand what wastes are generated from processing X-ray films, that some of these wastes are hazardous, and know what the key considerations are in deciding which management method to use.

B.1.1. Identify the specific wastes associated with dental x-ray processing.

Performance Objective 1: The student will be able to identify the most common solid and hazardous wastes generated during X-ray processing, and what the environmental concern is with each waste.

<u>Wastes:</u>	<u>Environmental concern:</u>
Scrap X-ray film	Recyclable; solid waste concern; not hazardous
Developer	Non-hazardous unless mixed with fixer
Wash water	Silver content; water quality concern
Fixer	High silver content; water quality concern;
HAZARDOUS	
Lead foil wrapping	Recyclable; lead content, HAZARDOUS

B.1.2. Understand the proper method of managing X-ray film processing wastes.

Performance Objective 1: The student will be able to describe the preferred method of managing the X-ray processing wastes, listed above.

Scrap X-ray film	Recycle, either through your supplier or a silver recycler
Developer	Used developer can be disposed to sanitary sewer - - check with local sewer utility first. (<i>Unused</i> developer with more than 1% hydroquinone should be disposed of as hazardous waste). Developer should be separated from fixer to reduce the amount of hazardous waste generated.
Wash water	Only dispose of wash water to sanitary sewer if silver levels are below state and local discharge limits
Fixer	Manage as hazardous waste, send off-site for recovery or treat on-site with silver recovery equipment. Must meet state and local discharge limits before discharge to sanitary sewer.
Lead foil wrapping	Manage as hazardous waste, through film manufacturer or metal reclaimer.

B.1.3. Identify the regulatory requirements and other key considerations involved in deciding how to best manage silver bearing wastes (developer) from X-ray processing.

Performance Objective 1: The student will be able to identify which authorities have jurisdiction over silver discharge limits, what those limits are, and how to determine which limits are applicable.

<u>Authority:</u>	<u>Silver Discharge Limit:</u>	<u>Applicable area:</u>
Washington State Department of Ecology	5 parts per million (ppm)	Statewide
Local Sewer Authority	Ranges from 0.1 - 3.0 ppm	Within local sewer district

Performance Objective 2: The student will be able to describe the most common off-site and on-site options for managing silver bearing wastes and how they are used. The student will also be able to list the other silver recovery technologies.

<u>Off-site options:</u>	<u>How to use:</u>
Hazardous waste disposal facility facility	Find listed in phone book, self-haul to
Hazardous waste disposal service	Find in phone book, set up pick up service
Local SQG haz. waste collection event	Call county environmental services for information and eligibility, or self-haul
Large photoprocessor or medical facility	Call to see about donating spent fixer

<u>On-site options:</u>	<u>How to use:</u>
<u>Common silver recovery equipment:</u>	
Chemical recovery canisters (CRC) log	Always use two CRCs in a series. Needs regular maintenance, testing, changeover
Electrolytic units	Use in conjunction with two CRCs in series

Other silver recovery technologies:
 Chemical precipitation
 Ion Exchange
 Reverse osmosis
 Evaporation/distillation

Performance Objective 3: The student will describe the key considerations involved in deciding whether to use off-site or on-site management for silver bearing wastes.

Key considerations:

- 1) If local limits apply and if these limits can be met with on-site equipment.
- 2) Trade-offs between off-site and on-site options:
 - The costs of off-site versus on-site management for the volumes of fixer generated.
 - Space for on-site equipment may be limited.
 - On-site recovery systems require routine maintenance and testing to function properly.

B.2. Understand that waste amalgam is hazardous waste and how to manage it.

B.2.1. Identify methods to safely and properly collect and manage amalgam wastes.

Performance Objective 1: The student will describe the methods used to safely collect waste amalgam and keep it from entering the drain.

Collection Methods:

Amalgam traps prevent chunks of amalgam from going down the drain. The traps should be cleaned regularly and the amalgam chunks stored in a sealed container for recycling.

Amalgam separators remove fine particles of amalgam from the waste water. The primary amalgam trap only captures the larger chunks of amalgam. An amalgam separator is necessary to catch the finer particles that bypass the amalgam trap. The amalgam sludge should be disposed of properly.

Use safety precautions when collecting waste amalgam. Since waste amalgam is associated with biohazardous waste, gloves and masks should be used when handling this waste before it is sterilized.

Performance Objective 2: The student will describe how the waste amalgam should be managed once it is collected. While it should be handled as a *biohazardous waste*, it must be treated as a *dangerous waste*.

Biomedical or biohazardous wastes are incinerated. Burning amalgam releases mercury into the air. Handle amalgam as a recyclable hazardous waste.

Management Methods:

As soon as it is collected, sterilize waste amalgam in an autoclave or through other methods. After sterilization, recovered amalgam should be managed through a recycling company or a hazardous waste management service.

Amalgam Recyclers: These companies have programs that recycle recovered amalgam. Some of them will pay for the recovered amalgam.

Hazardous waste management services: These companies will pick up recovered amalgam for a fee.

Business waste collection events: These local city and county events are available periodically and usually charge fees, the amount depends on the waste being disposed of.

B.3. Understand that some disinfectants, cleaning solutions and solutions from chemiclaves and ultrasonic devices may designate as hazardous waste.

B.3.1. Describe the waste management options for the most commonly used cleaning solutions and disinfectants associated with dental practices.

Performance Objective 1: The student will describe the proper disposal practices for the most commonly used cleaning solutions and disinfectants.

Certain waste cleaning and disinfecting solutions, although sometimes hazardous wastes, are considered “treatable” by sewage treatment plants.

Under the “Domestic Sewage Exclusion” of the Dangerous Waste Regulations, some hazardous wastes can be discharged to the sanitary sewer with permission from the sewer authority or the Department of Ecology. However, waste reduction and recycling options must be explored before permission to discharge is given.

1. Formaldehyde, Gluteraldehyde, Ammonia and Phenol:

Solutions containing low concentrations of these chemicals can usually be disposed of to the sanitary sewer with permission

2. Acetone and Bleach:

Waste solutions under certain concentrations that are treatable by the sewage treatment plant may be discharged with permission.

3. Isopropyl Alcohol and Ethanol:

These solutions may designate as hazardous waste depending on the constituents.

Performance Objective 2: The student will be able to describe some of the pollution prevention and best management practices regarding cleaning and disinfecting solutions.

Pollution Prevention and Best Management Practices

- Use the minimum amount of solution necessary for disinfecting and cleaning.
- Use up the product instead of pouring it down the drain to get rid of excess.
- Never put a cleaning solution, disinfectant or any other process waste into a **septic system**, no matter what the concentration is.
- Never pour flammable materials down the drain because of explosive danger.
- Always first try to reduce or recycle your wastes before disposal.

Environmental Competencies

- - - Evaluation - - -

Dear Vocational Instructor: In order to improve our services, the **Department of Ecology** asks you to please complete this evaluation on the environmental competencies you have used. We will use your comments for future revisions. **THANK YOU !**

This evaluation is for the environmental competency in (Circle):

AUTO REPAIR AUTO BODY DENTAL PHOTO
WOODWORKING

Ranking: Level of satisfaction / agreement: 1 = Low 5 = Average 10 = High

1). The information in this competency is appropriate for the students.

1 2 3 4 5 6 7 8 9 10

2). The level of detail was sufficient for me to teach it.

1 2 3 4 5 6 7 8 9 10

3). The supplemental materials answered most of my questions.

1 2 3 4 5 6 7 8 9 10

4). It was easy to incorporate the competency into the curriculum.

1 2 3 4 5 6 7 8 9 10

5). The layout was clear and easy to use.

1 2 3 4 5 6 7 8 9 10

6). It is important for students to learn about environmental management.

1 2 3 4 5 6 7 8 9 10

7). "I have incorporated this information into my curriculum."

1 2 3 4 5 6 7 8 9 10

8). Additional comments, or suggestions: _____

9). Requests for additional info: _____

10). **Name & Program:** _____

School: _____

Send to: Patricia Jatzak, Dept. of Ecology, P.O. Box 47600, Olympia, WA 98504-76 Or FAX: (360) 407-6715
